

tion *táysha* (just as Icelandic *stein*, stone, is in the earlier Gothic stains), is used as a salutation meaning friend, and was widely known and used as a Caddo word and as a designation for Caddo and friendly Indians; compare the meaning of Dakota, which is said to have meant friend and was used as a regular tribe name.

UTAH. Named from Spanish *Yuta*, Ute Indian, and the Spanish from Athopascan Indian meaning higher.

VERMONT. Intended to be French for the Green Mountains, the correct standard French for which would be: *les Montagnes Vertes*.

VIRGIN ISLANDS. In origin a religious name. Latin *virgo*, a virgin, has been ingeniously connected by Brugmann with Greek *parthenós* virgin, but perhaps an easier etymology is to connect it with Latin *virga*, sprout.

VIRGINIA. A colony name in artificial Latin in honor of Queen Elizabeth of England, who was fond of being known as the Virgin Queen.

WASHINGTON. Study of early spellings makes it absolutely certain that the name is *Wassington*, that the *sh* is a corruption, and that

the Anglo-Saxon would have been *Wassinga Tuun*, the villa or stockade of the *Wassings*. There are two, and were formerly probably three, places in England by this name. *Wassing* is patently a patronymic derived from *Wassa*, an old weak-declension personal name not extant in Anglo-Saxon writings. The genitive of this would have been, of course, *Wassan*, but in Anglo-Saxon weak declension nouns were already taking *-ing* with loss of the *-n-*. Such an English adjective as *Platonic*, *Plutonic*, taken from Greek, retains the *-n-*, but Anglo-Saxon already formed *Wass-ing* from *Wassa*, with loss of the weak *-n-*. The meaning of the personal name *Wassa* is not known.

WEST VIRGINIA. The second member has been treated above.

WISCONSIN. In origin the native Algonquian name meaning grassy.

WYOMING. Native Delaware Algonquian for large prairie-place, corroborated by the Iroquoian equivalent being extant. Not an ancient name, but a descriptive one, given by Indians to the site of the present Wilkes-Barre, Pa.

BOTANY.—*A preliminary account of the plant diseases of El Salvador.*<sup>1</sup> JOHN A. STEVENSON, Bureau of Plant Industry, Soils, and Agricultural Engineering, and FREDERICK L. WELLMAN,<sup>2</sup> Office of Foreign Agricultural Relations.

In the development of a national agricultural research program for the Republic of El Salvador it was deemed needful to make a study of the diseases affecting the economic plants of the country. Mycologists and plant-disease students have visited the Republic, but no one has hitherto made detailed collections of disease material. A knowledge of the naturally occurring plant diseases of a country is considered one of the essentials of an agricultural research program, and it has been one of the junior author's problems to obtain this information in El Salvador. The collections here reported were all made in 1943 during the months of May, June, July, and the first half of August. The six months' wet season had just begun when this work was started.

<sup>1</sup> Received February 5, 1944.

<sup>2</sup> The work of the junior author is in cooperation with the Centro Nacional de Agronomía of El Salvador.

El Salvador has an area of 13,176 square miles, somewhat less for example than that of Switzerland. It has a number of volcanoes, with one or more that are still quite active, and elevations where crops are grown vary from sea level on the coastal plain bordering the Pacific Ocean to around 9,000 feet. Its climate is affected by the cordillera that marks its boundaries with Guatemala and Honduras, and on its higher tablelands and mountain slopes where cultivation of crops is most intensive, it is almost temperate in character. In the lowlands along the Pacific and in the lower river valleys, such as that of the Río Lempa, the temperatures are typical of the deep tropics. It is a thickly populated country with a backbone of stable agriculture; large holdings maintained by wealthy landowners, a few moderate-sized farms handled by those of lesser means, and, most numerous, small plots that are worked on a subsistence basis

by the shifting type of cultivation indigenous to the country. Certain crops have been grown in El Salvador since prehistoric times (e.g., maize, beans, squash), and others have been introduced within more recent times (e.g., sugarcane, coffee), while such plants as abacá and fiber roselle have been grown in the country but a few years.

Published accounts of the plant diseases of El Salvador have been comparatively few. Dr. David J. Guzmán (5) published in 1919 a work entitled *Fitopatología, estudio de las enfermedades que afectan a las plantas agrícolas de El Salvador*. It contains a general discussion of plant diseases and insect pests and their control, but very few concrete references to plant diseases occurring in El Salvador. Furthermore, a number of the diseases he recorded for the country are not present, for example, sugarcane smut. His reports have not been incorporated here.

Standley and Calderón (6) included in their *Lista preliminar de las plantas de El Salvador* fungi from the excellent collections of Standley, a number of which were economic forms and have been recorded here under the several hosts involved. Two of the rust fungi collected by Standley were named by Dr. J. C. Arthur (2) as new to science.

In more recent years studies of coffee diseases have been made at the Coffee Experiment Station at Santa Tecla and records of these published in reports by S. Calderón, J. A. Alvarado, and F. Choussy (1, 3, 4).

In the following account the material is presented on a host basis, and in alphabetical order of the technical names of the plants involved. Disease-producing fungi are also listed alphabetically under the hosts. Localities are given and the collector's numbers where available. The collector in all cases is the junior author unless otherwise specified. The specimens have been divided and a set deposited in the mycological collections of the Bureau of Plant Industry and a representative set has been taken by the junior author for deposit in El Salvador.

AGAVE spp. Sisal, henequen.

*Colletotrichum agaves* Cav. This anthracnose

fungus produces oval leaf spots up to 1 cm in diameter with raised margins. On *Agave americana* L., Lake Ilopango Road, no. 300; on *A. fourcroydes* Lem., San Miguel, no. 240.

*Diplodia theobromae* (Pat.) Nowell causes a black rot of the leaves of *A. fourcroydes* Lem. (henequen), which brings about serious losses of fiber often reaching 25 percent of the crop in a given area. The fungus, which has been listed under a variety of names (*D. natalensis* P. Evans, *D. cacaicola* P. Henn., etc.), attacks a wide range of tropical and subtropical economic plants causing fruit rot, twig and branch die-back, and leaf spots and rot. Noted particularly at San Miguel, nos. 239, 241, 243, 244, 414; La Libertad, no. 400. An earlier specimen from El Salvador on *A. sisalana* Perr., collector and exact locality unknown, is also in the herbarium of the Bureau of Plant Industry.

ALLIUM spp.

*Alternaria porri* (Ell.) Saw. Black mold and purplish lesions on leaves of *Allium cepa* L. (onion). La Ceiba, no. 19 and *Allium porrum* L. (leek), Cuscutlan, no. 310.

ALTHAEA ROSEA Cav. Hollyhock.

*Virus*. An undetermined virus characterized by yellow chlorotic leaf lesions mixed with light and dark green islands. La Ceiba, no. 22.

ANDIRA JAMAICENSIS (W. Wright) Urb.

*Gloeosporium* sp. Anthracnose on leaves Plaza, San Miguel, no. 215.

*Polystigma pusillum* Syd. Forming angular brown leaf spots. Previously known from Guatemala and the Dominican Republic. Under the name *Physalospora andirae* F. L. Stevens, the fungus has been collected in Puerto Rico, Virgin Islands, and Panama. San Miguel, no. 215; San Salvador, no. 309.

BAUHINIA spp.

*Uromyces guatemalensis* Vest. Rust on leaves of *B. unguolata* L. Tonacatepeque, Dept. San Salvador, Standley, no. 19471; Santa Ana, Dept. Santa Ana, Standley, no. 20357.

*Uromyces jamaicensis* Vest. Rust on leaves of *B. pauletia* Pers. San Vicente, Dept. San Vicente, Standley, no. 21286.

BETA VULGARIS L. var. CICLA L. Swiss Chard.

*Cercospora beticola* Sacc. A leaf spot produc-

ing fungus which is common throughout the range of the host. La Ceiba, no. 77; Cuscutlan, no. 313.

*BOEHMERIA NIVEA* (L.) Gaud. Ramie.

*Virus*. An undetermined virus was noted causing a severe stunting and mild leaf mottling of infected plants. Santa Tecla, no. 283.

*BRASSICA OLERACEA* L.

*Alternaria brassicae* (Berk.) Sacc. Black leaf spots on leaves of cabbage, La Ceiba Exp. Stat., no. 78; Volcano San Salvador, no. 350; on leaves of cauliflower (*B. oleracea* var. *botrytis* L.), La Ceiba Exp. Stat., no. 27.

*BROMELIA KARATAS* L.

*Perisporium bromeliae* F. L. Stevens. Black sooty patches on leaves. San Miguel, no. 245.

*CAPSIUM FRUTESCENS* L. Pepper.

*Cercospora capsici* Heald & Wolf. Leaf spot of common occurrence. La Ceiba Exp. Stat., no. 74; Cuscutlan, no. 316.

*Cercospora diffusa* Ell. & Ev. Diffuse, brown fungus patches on lower leaf surfaces. Cuscutlan, nos. 315, 316.

*Virus*. An undetermined virus with symptoms resembling those of common tobacco mosaic. La Ceiba, no. 75.

*CARICA PAPAYA* L. Papaya.

*Oidium caricae* Noack. This typical powdery mildew, in common with most other tropical forms of the family Erysiphaceae, does not produce the perfect or ascus stage. Originally described from Brazil but occurs sparingly in other papaya growing countries. La Ceiba Garden, no. 82.

*Pucciniopsis caricae* (Speg.) Earle. This fungus, producing small, circular, black, rust-like spots on papaya leaves, occurs wherever the host is grown and is economically important in producing premature death of infected leaves. It is also known as *Asperisporium caricae* (Speg.) Maub., and a perfect stage (*Mycosphaerella*) has been described, but not verified. La Ceiba, no. 82; Los Chorros, no. 301. The latter specimen is overgrown in part by an apparently undescribed white mold.

*Virus*. A definite virus disease characterized by severe malformation of older leaves and a stunting and mottling of young growth was

noted at the La Ceiba Experiment Station, nos. 63, 64. The disease would appear to be similar if not identical with that reported for Jamaica and Puerto Rico.

*CASSIA* sp. Senna.

*Rhizoctonia* sp. A damping off of seedlings at La Ceiba, no. 330.

*CENTROSEMA PUBESCENS* Benth.

*Uromyces neurocarpi* Diet. Rust on leaves, Ahuachapán, Dept. de Ahuachapán, Standley, no. 19845.

*CITRULLUS VULGARIS* Schrad. Watermelon.

*Pseudoperonospora cubensis* (Berk. & Curt.) Rostew. Downy mildew. A common and often serious disease of this and other cucurbits. Shore of Lake Ilopango, no. 386; Valle San Juan, no. 430.

*CITRUS AURANTIFOLIA* (Christm.) Swingle. Lime.

*Cephaleuros virescens* Kunze. The algal leaf spot is common but never serious. Zapotitan, no. 365; Tejutla, no. 441.

*Elsinoë fawcetti* Bitanc. & Jenkins. The citrus scab fungus attacks the leaves and fruit, disfiguring the latter or even causing much premature dropping. Cuscutlan, nos. 318, 319.

*Mycosphaerella* sp. (?). A leaf spot characterized by brown, circular to irregular spots with much darker definite borders, showing on both surfaces of the leaves. The fungus is immature. Cuscutlan, no. 320.

*COCOS NUCIFERA* L. Coconut.

*Diplodia cococarpa* Sacc. Common on husks. Port of La Libertad, no. 399.

*Eosporium palmivorum* Sacc. Leaf spots on dead leaves. La Ceiba no. 393.

*Leptosphaeria* sp. On dead and dying leaf tips associated with the following.

*Pestalotia (Pestalozzia) palmarum* Cke. Associated with large, irregular, gray to deep brown leaf spots. La Cabana, no. 227; La Ceiba no. 292.

*CODIAEUM VARIEGATUM* (L.) Blume. Ornamental croton.

*Gloeosporium sorauerianum* Allesch. Anthracnose on leaves, marked by large, irregular, brown, diseased areas and often with premature defoliation. La Ceiba, no. 130.

COFFEA ARABICA L. Coffee.

*Capnodium coffeae* Pat. The sooty mold of coffee following the presence of aphids, mealybugs, or other insects is common in most coffee-growing areas. It is doubtless a mixture of several species, but for the most part conidial and pycnidial stages only are present. The name applied here is one of convenience only. Santa Tecla, nos. 101, 111; Santiago de Maria, S. Calderon, no. 2232.

*Cercospora coffeicola* Berk. & Cke. The brown eyespot is one of the common coffee leaf spots, but one which causes relatively little damage. Volcano San Salvador, nos. 11, 342; La Ceiba Exp. Station, no. 88; near Santa Ana no. 417. Also reported by Calderón (3) and Alvarado (1).

*Colletotrichum coffeanum* Noack. The antracnose fungus produces large, irregular, brown blotches on leaves. Santa Tecla, no. 110. Probably merely another strain of *Glomerella cingulata* (Stonem.) Spauld. & Schrenk.

*Heterodera marioni* (Cornu) Goodey. The root-knot nematode was found producing heavy infections of roots of seedlings at Santa Tecla, no. 278. Determination verified by G. Steiner.

*Micropeltis applanata* Mont. Fly-speck fungus on leaves. Santa Tecla, S. Calderón, no. 2237.

*Mycosphaerella coffeicola* (Cke.). Leaf spot. Volcano Quetzaltepeque (San Salvador), no. 342; Santa Ana, S. Calderón, collector.

*Omphalia flavida* Maubl. & Rangel. The American leaf or eyespot disease, which is caused by this fungus, is widespread in the American tropics on coffee and various other economic woody plants and is doubtless widespread in El Salvador but is reported to date only from Santa Tecla from the collections of S. Calderón (3). In the past the fungus has been classified erroneously as *Stilbum flavidum* Cke. and *Stilbella flavida* (Cke.) Lindau.

*Rhizoctonia* sp. Coffee seedlings killed by a "damping off" fungus of the genus *Rhizoctonia*, and probably a strain of *R. solani* Kuehn, were noted at Santa Ana, no. 21, and at Santa Tecla, nos. 105, 106.

*Nonparasitic leaf abnormalities.* Several types of bronzing, chlorosis, and similar disturbances were noted on coffee leaves at Santa Tecla, due

possibly to lack of shade, soil deficiencies, and other environmental or cultural difficulties.

CUCUMIS SATIVUS L. Cucumber.

*Erysiphe cichoracearum* DC. Powdery mildew occurs commonly on this host, but in the conidial (*Oidium*) stage only. La Ceiba Exp. Stat., no. 29.

*Pseudoperonospora cubensis* (Berk. & Curt.) Rostew. Downy mildew is a common disease on this host and often destructive. La Ceiba Exp. Stat. nos. 28, 72.

*Virus.* An undetermined virus disease was noted which was not typical of that due to *Marmor cucumeris* var. *vulgare* Holmes, but was characterized by the harsh, corrugated appearance of the leaves with vein clearing. La Ceiba Exp. Stat., no. 30.

CUCURBITA spp. Pumpkin, squash.

*Cercospora cucurbitae* Ell. & Ev. Leaf spot on *C. maxima* Duchesne. Zapotitan, no. 425; Valle de San Juan, no. 431.

*Erysiphe cichoracearum* DC. Powdery mildew in the *Oidium* stage is common on all types of *Cucurbita*. Shores of Lake Ilopango, no. 385; Volcano de San Salvador, no. 261; San Andres, no. 362. The fungus on the first specimen cited is overgrown by *Cicinnobolus cesatii* D By.

*Virus.* An undetermined virus disease of the *Marmor* type characterized by severe mottling of leaves and stunting of plants of *Cucurbita pepo* L. occurred near Sacocayo, no. 146; shores of Lake Ilopango, no. 389; near Aguafria, no. 427.

CYMBOPOGON NARDUS (L.) Rendle. Citronella grass.

*Virus.* A leaf mottling typical of *Marmor sacchari* Holmes, which occurred on sugarcane in adjoining fields, was noted at Santa Tecla, no. 275.

CYNODON DACTYLON (L.) Pers. Bermuda grass.

*Helminthosporium giganteum* Heald and Wolf. The fungus causes yellow or straw-colored spots with narrow brown borders on leaves. Previously reported from Texas. Cafetelera Station, Santa Tecla, no. 276.

*Puccinia cynodontis* Delacr. The rust on this host is a widespread fungus, often injurious. Zacatecoluca, no. 434.

DATURA STRAMONIUM L.

*Alternaria crassa* (Sacc.) Rands. On leaves. Los Planos, no. 4.

*Virus*. An undetermined virus causing chlorosis and stunting of infected plants was seen at Los Planos, no. 5.

DAUCUS CAROTA L. Carrot.

*Alternaria carotae* (Ell. & Langl.). Leaf blight occurred at La Ceiba, no. 33; Volcano San Salvador, no. 341.

DESMODIUM spp.

*Alternaria* sp. Associated with a leaf-spotting, on *Desmodium* sp. Santa Tecla, no. 281.

*Cercospora desmodii* Ell. & Kell. Leaf spot on *Desmodium* sp. La Cabana, no. 225.

*Isariopsis caespitosa* Petr. & Cif. Angular leaf spot on *Desmodium* sp. Near Herradura, no. 390; Lagarto, no. 428. Doubtfully distinct from *I. griseola* Sacc., occurring on *Phaseolus* and other legumes.

*Parodiella perisporioides* (Berk. & Curt.) Speg. On leaves of *Desmodium nicaraguense* Benth. & Oerst. Santa Tecla, no. 280.

*Uromyces hedysari-paniculati* (Schw.) Farl. Rust on leaves of *Desmodium barclayi* Benth., Ahuachapán, Dept. de Ahuachapán, Standley, no. 19846; *Desmodium nicaraguense* Benth. & Oerst., Santa Tecla, no. 280; *Desmodium scorpiurus* (Sw.) Desv., near San Salvador, Standley, nos. 19651, 22743.

*Virus*. An undetermined virus marked by mottling of leaves of *D. rensoni* Painter, Santa Tecla, no. 282.

EPIDENDRUM DIFFORME Jacq.

*Uredo guacae* Mayor. A rust disfiguring the leaves of *Epidendrum* spp. and related orchids in Central America and the West Indies. The record of its occurrence in El Salvador is based on a specimen found by Plant Quarantine inspectors on a plant offered for entry at San Francisco.

EUPHORBIA PULCHERRIMA (Klotzsch) Graham.  
Poinsettia.

*Oidium* sp. This appears to be the first report of a powdery mildew on this host. As is so commonly the case with tropical material, the perfect stage of the fungus is not present. It is possible that *Sphaerotheca euphorbiae* (Cast.) Salmon is the species involved. The fungus produces circular to irregular yellow to brown spots up to 1 cm in diameter, disfiguring the leaves and greatly lowering their ornamental value. La Ceiba, no. 96.

FIGUS CARICA L. Fig.

*Physopella fici* (Cast.) Arth. The common fig rust brings about premature leaf fall. Finca Santa Ana, San Miguel, no. 210 (Uredo stage only).

FRAGARIA CHILOENSIS Duchesne. Strawberry.

*Mycosphaerella fragariae* (Tul.) Lindau. This fungus, producing a typical and at times damaging leaf spot, has followed the cultivated strawberry around the world. The conidial stage (*Ramularia tulasnei* Sacc.) was collected near the top of Volcano San Salvador, no. 351.

FURCRAEA sp.

*Colletotrichum agaves* Cav. Anthracnose on leaves. San Miguel, S. Calderón, collector, no. 2549; near San Jacinto, no. 2556.

*Dothidella parryi* (Farl.) Th. & Syd. On leaves, near San Salvador, S. Calderón, collector.

*Trichocladium olivaceum* Mass. On leaves. San Miguel, S. Calderón, collector, no. 2549.

GLIRICIDIA SEPIUM H. B. K. Madre de cacao.

*Cyphella villosa* Pers. ex Karst. Associated with a die-back condition of branches and twigs. Santa Tecla, no. 59a.

*Fusarium decemcellulare* Brick. Associated with cankers on stem and branches. Collected by S. Calderón, Santa Tecla.

*Isariopsis* sp. Causes definite, dark brown spots, 2-4 mm in diameter, fruiting on the lower surface. San Andres, no. 359.

*Phomopsis* sp. Associated with a die-back of twigs. Does not appear to differ from *Ph. gliricidiae* Syd., nor from *Ph. citri* Fawc., which latter form Wehmeyer considers the imperfect stage of *Diaporthe medusaea* Nitsch.

*Rosellinia pepo* Pat. Black root rot on rotting roots. Santa Tecla, collected by S. Calderón.

HIBISCUS sp. Fiber roselle.

*Oidium* sp. A powdery mildew on leaves which showed only the imperfect stage and hence was not further determinable, occurred at La Molina, Santa Ana, no. 305.

*Vermicularia dematium* Fr. Associated with cankered areas at base of plants. Santa Tecla, no. 122. Many plants at the Station have shown abnormal leaf fall and other abnormalities, but parasitic fungi do not appear to be involved and the trouble is more evidently the result of unfavorable environment. Various secondary fungi occur on dead and dying leaves and stalks.

## INGA spp.

*Perisporium truncatum* F. L. Stevens. Black mildew on living leaves of *Inga preusii* Harms, vicinity of San Salvador, P. C. Standley.

*Ravenelia ingae* (P. Henn.) Arth. A rust on leaves and twigs of *Inga preusii* Harms, often causing malformations. La Ceiba, no. 368, on *Inga* sp. La Ceiba, no. 338; near San Salvador, P. C. Standley, no. 22461. The latter specimen was originally named as *R. whetzelii* Arth., now considered synonymous with *R. ingae*.

*Virus*. A possible virus disease producing a mottling of leaves of *Inga* sp. was observed at the La Ceiba Exp. Stat., nos. 334, 335, 336.

## LACTUCA SATIVA L. Lettuce.

*Septoria lactucae* Pk. Leaf spot causing defoliation. La Ceiba, nos. 15, 194.

## LYCOPERSICUM ESCULENTUM Mill. Tomato.

*Cladosporium fulvum* Cke. This common and often destructive leaf mold occurred on both native and introduced types. La Ceiba Exp. Stat. no. 81; Herredura, no. 391; Izalco, no. 421.

*Septoria lycopersici* Speg. Leaf spot was very severe on certain varieties, particularly the small fruited native type, near Volcan de Izalco, no. 175.

## MANGIFERA INDICA L. Mango.

*Colletotrichum gloeosporioides* Penz. Mango anthracnose is common wherever the tree is grown, causing a blackening of the fruit. Young leaves are distorted and large, irregular deep brown blotches are produced on more mature ones. La Ceiba Exp. Stat., on fruit and leaves, no. 32; near Pan Chamalco, no. 397.

*Phyllosticta mortoni* Fairman. This fungus causes a leaf spot characterized by numerous, small, angular gray spots with definite dark-brown margins. Previously reported from Florida, Puerto Rico, Cuba, Guatemala, and Mexico. Sonsonate, no. 187; Finca Santa Ana, San Miguel, no. 211.

## MANIHOT ESCULENTA Crantz. Manihot, yuca, cassava.

*Cercospora henningsii* Allesch. This fungus causes brown circular to irregular spots and blotches on the leaves, 5 mm or more in diameter in contrast to the small (2-3 mm) definite spots with white centers due to *C. caribaea* Cif. Near Mercedes, Umaña, no. 411; near Izalco, nos. 422, 423.

*Oidium manihotis* P. Henn. The powdery mildew of this host is in the *Oidium* stage only, producing irregular light brown blotches on the leaves with a white powdery layer showing beneath. Also known from Central Africa, Brazil, and Peru. La Ceiba, no. 291.

*Phyllosticta* sp. Associated with small (1-2 mm) leaf spots, silvery white above, reddish brown beneath. Along shores of Lake Ilopango, no. 381.

*Virus*. Typical mottling, stunting and malformation of the *Marmor* type, associated with aphids. La Ceiba Exp. Stat., no. 290; near Mercedes, Umaña, nos. 412, 413.

MEDICAGO SATIVA L.<sup>3</sup> Alfalfa.

*Bacterium alfalfae* Riker, F. R. Jones & Davis (?). Bacterial leaf spot has been known heretofore only from the United States. Specimens from Santa Tecla, nos. 117, 118, 119, are doubtfully referred to this species.

*Cercospora* sp. (probably *C. zebrina* Pass.) Leaf spot. Santa Tecla, no. 117.

*Rhizoctonia* sp. Associated with bleached spots on stems. Santa Tecla, no. 120.

*Uromyces striatus* Schroet. The rust is common and widespread on this host in El Salvador but not serious. Santa Tecla, nos. 116, 118.

## MELICocca BIJUGA L. Spanish lime.

*Virus*. An undetermined virus causing severe mottling of leaves. La Ceiba, no. 90.

## MUSA PARADISIACA L. Banana.

*Cercospora musae* Zimm. The "sigatoka" disease of bananas, which has caused heavy losses in many banana-growing countries was collected at La Ceiba, no. 79, and at Tomatopeque, no. 438.

*Cordana musae* (Zimm.) Hoehn. Cordana leaf spot attacking the "Cavendish" variety, Los Planos, no. 2.

## PACHYRHIZUS sp. Jicama.

*Isariopsis griseola* Sacc. This species, causing an angular leaf spot, is usually confined to *Phaseolus* and its reference to *Pachyrhizus*, a new host genus is somewhat doubtful. However it does not appear to differ morphologically from the form on *Phaseolus*. La Ceiba, nos. 99, 100, 455.

<sup>3</sup> All determinations of organisms on *Medicago* are by C. Lefebvre.

## PANICUM spp. Panicum grasses.

*Cercospora fusimaculans* Atk. A leaf-spot disease characterized by linear brown spots on Guinea grass (*Panicum maximum* Jacq.). San Andres, no. 357; Zacatecoluca, no. 433. Previously known from Colombia, Panama Canal Zone, and Brazil as well as the southern United States.

*Uromyces leptodermus* Syd. Rust on leaves of *Panicum purpurascens* Raddi (*Panicum barbinode* Trin.) Pará grass. Near San Salvador, Standley, no. 19677.

## PASPALUM spp.

*Claviceps paspali* F. L. Stevens & J. G. Hall. This common *Paspalum* ergot fungus, which is poisonous to livestock, was collected at Montserrat, no. 485, on *Paspalum* sp.

## PASSIFLORA QUADRANGULARIS L. Granadilla.

*Cercospora regalis* Tharp. Leaf spots. La Ceiba, no. 34.

## PERSEA spp. Avocado and relatives.

*Cercospora purpurea* Cke. (?). The common leaf-spot-producing fungus of the avocado (*Persea americana* Mill.) is tentatively assigned to this species, pending more detailed study. It produces numerous, small, angular, dull brown spots and has been previously known from the state of Florida. A possible perfect stage (*Mycosphaerella*) has been reported by H. E. Stevens from that State. La Ceiba, no. 462.

*Cephaleuros virescens* Kunze. The algal leaf spot was common and abundant on *Persea schiedeana* Nees, an avocado relative, intermingled with *Strigula complanata* Fee, a leaf inhabiting lichen. Santa Tecla, nos. 115, 116.

## PETROSELINUM CRISPUM (Mill.) Nym. Parsley.

*Cercospora apii* Fres. Leaf spot. Slopes of Volcano de San Salvador, no. 340.

## PHASEOLUS LUNATUS L. Lima bean.

*Elsinoë phaseoli* Jenkins. Lima bean scab was found on the leaves and pods of a specimen collected by S. Calderon, San Salvador, and deposited at the Gray Herbarium, Cambridge, Mass. (Phytopathology 23: 602. 1933).

## PHASEOLUS VULGARIS L. Bean.

*Chaetoseptoria* sp. See discussion of this fungus under *Vigna* (cowpea). La Ceiba, nos. 126a, 126b, 128.

*Isariopsis griseola* Sacc. Angular leaf spot is common on beans in all localities and does some damage. La Molina, nos. 306, 307; Cuscutlan,

no. 312, slopes of Volcano San Salvador, no. 343; near Izalco, no. 419.

*Myrmaecium roridum* Tode. On matured pods near Paraiso, no. 449.

*Periconia pycnospora* Fres. On matured pods, near Paraiso, no. 449a. Determined by E. K. Cash.

*Uromyces phaseoli typica* Arth. The universally distributed bean rust contributes directly to crop reduction by destruction of leaves. La Ceiba, no. 128; near Sacocoyo, nos. 136, 137; La Molina, Santa Ana, nos. 306, 307; near Izalco, no. 420; near Paraiso, no. 448; vicinity of San Salvador, collector Standley, nos. 19600, 23303. (Reported by Standley and Calderón (6) as *U. appendiculatus* [Pers.] Fr.)

*Vermicularia polytricha* Cke. On matured pods. Near Paraiso no. 449.

## PHOENIX sp. Palm.

*Graphiola phoenicis* (Moug.) Poit. The false smut of *Phoenix* and related palms is omnipresent and always disfiguring. La Ceiba, no. 16.

## PITHECELOBIUM DULCE (Roxb.) Benth.

*Microstroma pithecolobii* Lamkey. This fungus, causing a leaf mold disease, has been known previously only from Puerto Rico on *Samanea saman* (Jacq.) Merr. La Ceiba, no. 86.

*Virus*. Causing a yellow mottling of leaves. La Ceiba, no. 87.

## PRUNUS PERSICA (L.) Batsch. Peach.

*Tranzschelia pruni-spinosae* (Pers.) Diet. The peach leaf rust occurs co-extensively with its host and is often a serious defoliator. Los Planos near San Salvador, no. 6; slopes of Volcano San Salvador, no. 344. The latter specimen is parasitized by *Darluca filum* (Biv.) Cast., which possibly helps to keep the rust in check.

## PSIDIUM GUAJAVA L. Guava, Guayaba.

*Meliola psidii* Wint. Black mildew on leaves, common, but not serious. San Salvador, P. C. Standley, collector.

## PUNICA GRANATUM L. Pomegranate.

*Cercospora punicae* Syd. Leaf spot, not serious. *C. lythracearum* Hald & Wolf is synonymous. La Ceiba, no. 492.

## RAPHANUS SATIVUS L. Radish.

*Albugo candida* Pers. ex Kuntze. The white rust is common and widespread, but seldom destructive, wherever the host is grown. La Ceiba Exp. Stat., no. 73.

RICINUS COMMUNIS L. Castor bean.

*Cercospora ricinella* Sacc. & Berl. This common leaf spot producing fungus characterized by numerous, small circular to angular, white centered spots causes severe defoliation at times. San Andres, nos. 198, 199, 200; San Miguel, no. 216.

ROSA spp. Rose (cultivated varieties).

*Actinonema rosae* (Lib.) Fr. This common and widespread disfiguring leaf spot disease known as "black spot" was collected at the La Ceiba rose garden, no. 23 and at Cuscutlan, no. 314. The fungus also has a perfect stage (*Diplocarpon rosae* Wolf) not yet found in Salvador.

*Cercospora puderi* B. H. Davis. This fungus causes small spots (up to 4 mm in diameter) with gray centers. La Ceiba rose garden, nos. 24, 25. This species has been previously known from the southern United States and Mexico, but is much less common than the ubiquitous *C. rosicola* Pass., which is characterized by larger spots and with sporulation on both surfaces.

*Diplodia* sp. Associated with dieback. La Ceiba Exp. Stat., nos. 66, 67.

*Stilbella cinnabarina* (Mont.) Wr. Fruiting on dead and dying stems of *Rosa odorata* Sweet. La Ceiba rose garden, no. 69.

RUBUS spp.

*Elsinoë veneta* (Burk.) Jenkins. Anthracnose on stems and leaves of a blackberry (*Rubus* sp.) near the top of Volcano San Salvador, no. 347. The imperfect stage only (*Sphaceloma*) of the fungus was present. Determination by Anna E. Jenkins.

*Spirechina rubi* (Diet. & Holw.) Holw. Rust on leaves of *Rubus adenotrichos* Schlecht. Volcan de San Salvador, collector P. C. Standley.

SACCHARUM OFFICINARUM L. Sugarcane.

*Leptosphaeria sacchari* V. B. de Haan. The "ring spot" disease due to this fungus is common on older leaves, as in all other cane growing countries. La Cabana, nos. 221, 231.

*Virus*. Mosaic (*Marmor sacchari* Holmes) is prevalent and severe throughout the country on susceptible varieties.

SALIX CHILENSIS Mol. Willow.

*Melampsora abietis-capraearum* Tub. (*Melampsora humboldtiana* Speg.) Rust on leaves.

Ahuachapán, Dept. de Ahuachapán, Standley, 20255.

SECHIMUM EDULE Sw. Chayote, huisquil.

*Rhagadolobium cucurbitacearum* (Rehm) Th. & Syd. Tar spot disease of the leaves, disfiguring, but seldom serious. La Ceiba, no. 70.

SOLANUM spp.

*Cercospora diffusa* Ell. & Ev. Black leaf spot on *S. nigrum* L. Shores of Lake Ilopango, no. 384.

*Cercospora solani-torvi* Frag. & Cif. Leaf spot on *Solanum* sp. (probably *S. torvum* Sw.), near Zaragoza, no. 402.

SORGHUM HALEPENSE (L.) Pers. (*Holcus halepensis* L.) Johnson grass.

*Cercospora sorghi* Ell. & Ev. Causing a leaf spot near Herradura, no. 395.

*Gloeocercospora sorghi* Bain & Edgerton. Leaf blotch, a disease heretofore known only from the southern United States. La Laguna, no. 322.

*Helminthosporium turcicum* Pass. La Laguna, no. 322.

*Puccinia purpurea* Cke. The rust was collected by S. Calderón, no. 41a.

SORGHUM VULGARE (L.) Pers. (*Holcus sorghum* L.) Sorghum.

*Cercospora sorghi* Ell. & Ev. Leaf spots, common at La Ceiba, no. 132.

*Colletotrichum graminicolum* (Ces.) G. W. Wils. Anthracnose. West of San Vicente, no. 208; near San Jose del Sacario, no. 443. World wide on most species of grasses.

*Helminthosporium turcicum* Pass. Leaf spot and blotch. La Ceiba, no. 132.

*Puccinia purpurea* Cke. Very common everywhere on this host, producing large irregular, deep red blotches on leaves. La Ceiba, Puerta, no. 375.

*Virus*. Near sugarcane fields, where sugarcane mosaic (*Marmor sacchari* Holmes) was present, and hence the same virus is probably involved here. Santa Tecla, no. 269.

SORGHUM VULGARE var. SUDANENSE (Piper) Hitchc. (*Holcus sudanensis* Piper). Sudan grass.

*Cercospora sorghi* Ell. & Ev. Leaf spot. La Ceiba, nos. 131, 133, and 135.

TECOMA STANS (L.) H. B. K.

*Prospodium appendiculatum* (Wint.) Arth. Rust common on the leaves of this ornamental



tree. Ahuachapán, Dept. de Ahuachapán, Standley 19905; near San Martín, Dept. de San Salvador, 22590.

**TETRAGONIA EXPANSA** Thunb. New Zealand spinach.

*Cercosporina tetragoniae* Speg. Leaf spot. Slopes of Volcano San Salvador, no. 348.

**TRITICUM AESTIVUM** L. Wheat.

*Puccinia rubigo-vera tritici* (Erikss. & P. Henn.) Carleton. Both stages (uredial and telial) of this common leaf rust of wheat were found. Slopes of Volcano San Salvador, nos. 247, 248, 249, and 353.

*Septoria tritici* Rob. A scanty collection of this common wheat parasite was made on the slopes of Volcano San Salvador, no. 353.

**VIGNA SINENSIS** (Torner) Savi. Cowpea.

*Cercospora canescens* Ell. & Martin. Leaf spot near Sacocoyo, nos. 140, 143.

*Chaetoseptoria* sp. This fungus was associated with large, circular leaf spots. Tehon described (Mycologia 29: 444-445. 1937) the genus as new and established the species *C. vignae* on *Vigna sinensis*. The Salvador fungus has conidia up to 150 $\mu$  long in contrast to 18-50 $\mu$  reported by Tehon for those of *C. vignae*. The pycnidia are also much larger than those of the Illinois fungus. Near Sacocoyo, no. 140; Zapitotan, no. 424.

*Erysiphe polygoni* DC. This powdery mildew, in the *Oidium* stage only, as is usual in tropical collections, was collected at Los Planos, near San Salvador, no. 3.

**VITIS VINIFERA** L. Grape.

*Alternaria vitis* Cav. Associated with leaf spots. Los Planos, near San Salvador, no. 8.

*Mycosphaerella* sp., in circular light-brown leaf spots, with dark brown definite borders. La Laguna, no. 325.

*Phytophthora vitis* (Thuem.) Arth. The grape rust, also known as *Phakopsora vitis* (Thuem.) Syd., occurs commonly on vinifera grapes, causing some defoliation; the fungus also is present in the southern United States, the West Indies, Guatemala, and northern South America. Los Planos, near San Salvador, no. 7; Santa Ana, no. 308; San Salvador, no. 463.

**YUCCA ELEPHANTIPES** Regel. Izote.

*Didymosphaeria* sp. A species, distinct because of its larger spores from *D. yuccogena*

(Cke.) Sacc. and *D. clementsii* Sacc. & D. Sacc., causing leaf spots was found on the lower slopes of Volcan de San Salvador, no. 267.

*Gloeosporium* sp. (*Gl. yuccigenum* Ell. & Ev.?) Anthracnose of leaves, forming large concentrically zoned diseased areas. Lower slopes, Volcan de San Salvador, nos. 266, 267.

*Leptosphaeria obtusispora* Speg. The fungus produces large, irregular, dull brown blotches on the leaves. It differs from the more common *L. filamentosa* Ell. & Ev. in its 5-septate spores as contrasted to the 3-septate spores of the latter species. La Ceiba, no. 332.

*Sphaerodothis pringlei* (Pk.) Th. & Syd. Tar spot fungus on leaves. On lower slopes, Volcan de San Salvador, no. 267; slopes of Volcan San Salvador, no. 354.

**ZEAMAYS** L. Corn, maize.

*Angiopsora zaeae* Mains. This is one of the rarer rust fungi occurring on *Zea*, heretofore reported as found sparingly in Puerto Rico, the Dominican Republic, Guatemala, and Trinidad. For a discussion of this and certain of the other corn rusts see article by G. B. Cummins (Phytopath. 31: 856-857. 1941). Zapotitan, nos. 360, 361 (both uredial and telial stages.)

*Cercospora sorghi* Ell. & Ev. A common leaf spot producing fungus. La Ceiba, nos. 378, 379; near Herradura, no. 394. Distinct from *C. zaeae-maydis* Tehon and Daniels, which is described with conidia 5-9 $\mu$  wide, in contrast to 3 $\mu$  as described for the former.

*Cladosporium herbarum* Lk. Associated with large irregular, dead areas on leaves, near San Estabán, nos. 409, 429. Other fungi present were *Alternaria* sp., *Fusarium* sp., *Periconia* sp., and *Nigrospora oryzae* (Berk. & Br.) Petch all possibly secondary.

*Curvularia geniculata* (Tracy & Earle) Boed. Associated with elongated brown lesions on leaves. La Cabana, no. 237.

*Diplodia zaeae* (Schw.) Lév. Ear rot. La Ceiba, no. 373.

*Fusarium* sp. Associated with ear rot and occurring also with other molds on leaves and husks. La Ceiba, no. 372.

*Helminthosporium turcicum* Pass. A very common and widespread fungus on maize in Salvador and one that apparently causes much damage by destroying leaves. Secondary fungi quite commonly are present also on diseased material. Near Sonsonate, nos. 151, 152; near

Izalco, no. 177; Zapotitan, nos. 188, 189; San Andrés, nos. 159, 164, 193, 194, 195; La Cabana, nos. 235, 238; La Ceiba, no. 377; near San José del Sacario, no. 444.

*Nigrospora oryzae* (Berk. & Br.) Petch. Associated with leaf spots, and cob rot, La Union, no. 429.

*Physoderma zae-maydis* Shaw. This fungus causes the disease known as brown spot. It is an important and widespread disease of corn in tropical and subtropical countries, there being reports of its occurrence in China, India, Central Africa, Brazil, and Guatemala. Although described originally from India, it is doubtless of American origin and Tisdale (Journ. Agr. Res. 16: 137-154. 1919) says of it, "It is possible that the disease was introduced into the United States from Mexico or Central America with *Euchlaena mexicanum*." *Physoderma maydis* Miy. described from Japan does not appear to differ. The Salvador material is typical both in the disease symptoms and in the morphology of the fungus except that the sporangia are somewhat smaller (15-18 by 15-21 $\mu$ ) than those described by Tisdale. Near Sonsonate, no. 176; near Izalco, no. 177; La Ceiba, nos. 123, 125; San Andrés, nos. 160, 161, 164, 194; Zapotitan, no. 367.

*Puccinia pallescens* Arth. A second species of rust found sparingly in the uredial stage only at Los Planos, near San Salvador, no. 1.

*Puccinia polysora* Underw. The third species of corn rust prevalent in the country. Found in both uredial and telial stages, near Talchallaya, no. 446; and near Paraiso, no. 447.

*Puccinia sorghi* Schw. The most common and widespread of the four species of rust attacking *Zea*. Collected around the edge of the crater of Volcano de San Salvador, nos. 253-258. The rust on several of the specimens is overgrown

by the ubiquitous rust parasite, *Darluca filum* (Biv.) Cast.

*Ustilago maydis* (DC.) Cda. (*U. zae* [Beckm.] Unger.). The common corn smut occurs abundantly as in all corn growing countries. La Ceiba, no. 370; near Izalco, no. 436; near Paraiso, no. 451.

*Virus*. An undetermined virus disease causing a mottling of leaves was noted near Sonsonate, no. 174.

ZINNIA ELEGANS Jacq. (*Crassina elegans* [Jacq.] Kuntze). Zinnia.

*Cercospora zinniae* Ell. & Martin. This leaf spot fungus causes serious defoliation of the zinnia in El Salvador. *C. atricinata* Heald & Wolf, named from Texas, does not appear distinct. La Ceiba Exp. Stat., nos. 62, 76; Sonsonate, no. 180.

#### LITERATURE CITED

- (1) ALVARADO, J. A. *Informe de los trabajos de la Estación Experimental de Santa Tecla del 15 Abril al 31 de Diciembre de 1939*. El Café de El Salvador, Rev. Assoc. Cafet. El Salvador 10: 147-186. 1940.
- (2) ARTHUR, J. C. *New species of Uredineae XV*. Bull. Torr. Bot. Club 51: 51-59. 1924.
- (3) CALDERÓN, S. *El ojo de gallo del café*. El Café de El Salvador, Rev. Assoc. Cafet. El Salvador 3: 1-5. 1933.
- (4) CHOUSSY, F. "*Mal de heridas*" o "*Mal de poda*" del Cafeto. El Café de El Salvador, Rev. Assoc. Cafet. El Salvador 10: 312-315. 1940.
- (5) GUZMÁN, DAVID J. *Fitopatología, estudio de las enfermedades que afectan a las plantas agrícolas de El Salvador*: 142 pp. San Salvador, 1919.
- (6) STANDLEY, PAUL C., and CALDERÓN, SALVADOR. *Lista preliminar de las plantas de El Salvador*: 274 pp. [Fungi, pp. 12-17]. 1925.

ENTOMOLOGY.—*A new species of Anopheles from the Solomon Islands*.<sup>1</sup> JOHN N. BELKIN and RALPH J. SCHLOSSER, Sanitary Corps, U. S. Army. (Communicated by ALAN STONE.)

In the Lunga district of Guadalcanal Island, British Solomon Islands Protectorate, a survey of the anophelines was made. Four distinct forms of anophelines were encountered, a species of *Bironella* (*walchi*?), two forms of *A. punctulatus* Dönitz, and a species of *Anopheles*, which is described here-

with. In reports from this area in the past few months this species has been called *A. p. punctulatus* Sw. & Sw. Investigations of the role of *A. p. punctulatus* in the transmission of disease on this island were actually carried out with this new species and not with *A. p. punctulatus* as reported. A summary of these investigations is given at the end of the paper. The senior author was very for-

<sup>1</sup> Received June 29, 1944.